Docket No.	:	ADAMSRI.031A	**Customer No.: 20,995**
Application No.	:	10/664,699	
Filing Date	:	September 18, 2003	

APPEAL BRIEF

Applicant	:	Leary et al.
App. No	:	10/664,699
Filed	:	September 18, 2003
For	:	AIRCRAFT WATER HEATING SYSTEM
Examiner	:	Mark H. Paschall
Art Unit	:	3742

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Robert J. Roby, Reg. No. 44,304

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Appellant, Applicant in the above-captioned patent application, appeals the rejection of Claims 1, 2, and 4-25 set forth in the Office Action mailed on January 31, 2007 (hereinafter "the Final Office Action"). All of these claims have been twice rejected. In accordance with the Notice of Appeal filed May 31, 2007, Appellant submits this Appeal Brief. Please charge any fees that may be required now or in the future to Deposit Account No. 11-1410.

TABLE OF CONTENTS

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is the assignee of the present application, Adams Rite Aerospace, Inc. ("Assignee"). Assignee is the owner of one-hundred percent interest in the present application as evidenced by an assignment recorded at Reel No. 014519, Frame 0848 by the Assignment Branch of the United States Patent and Trademark Office.

II. RELATED APPEALS AND INTERFERENCES

Appellant, Appellant's legal representative and Assignee are unaware of any prior or pending appeal, interference or judicial proceeding that may be related to, that may directly affect, that may be directly affected by, or that may have a bearing on the Board's decision in the present appeal. Because of this lack of knowledge, no decisions are included in the appendix labeled RELATED APPEALS AND INTERFERENCES.

III. STATUS OF CLAIMS

Currently, the following status exists for each of the claims: Claims 1, 2, 4 and 6-25 stand rejected as being unpatentable. Claims 3 and 5 were previously cancelled.

The rejections of Claims 1, 2, 4 and 6-25 are being appealed.

IV. STATUS OF AMENDMENTS

No amendments have been filed subsequent to the rejection. Therefore, the claims before the Board appear as they were rejected in the Office Action mailed on January 31, 2007.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present application includes three independent claims, Claims 1, 14 and 19. Each independent claim is summarized below, with citations to corresponding portions of the originally-filed specification and drawings as required by 37 C.F.R. § 41.37(c)(1)(v). The originally-filed specification and drawings are attached as Exhibit A. These citations are provided to illustrate specific examples and embodiments of the recited claim language and may not include all examples of the recited claim language. Further, these citations should not be used to limit the claims.

Claim 1

Claim 1 is directed to a water heating apparatus for use with a wash basin on an aircraft. The water heater comprises:

- a tube (*see, e.g., element 10 in Figure 1, and page 2, paragraph **[0012]**, lines 1-2*) made of a good heat conductive material (*see, e.g., page 2, paragraph **[0013]**, lines 1-3*);
- the tube comprising a plurality of coils (*see, e.g., Figure 1 and page 3, paragraph **[0013]**, lines 6-8, and page 4, paragraph **[0018]**, lines 1-4*) with each coil either engaging or being close to an adjacent coil (*see, e.g., Figure 1*);
- an electric heater (*see, e.g., element 12 in Figure 1 and page 2, paragraph **[0012]**, lines 2-3*) extending along a substantial length of the tube in good heat conductive relation with the tube (*see, e.g., page 2, paragraph **[0012]**, lines 2-3 and 4-7*);
- the electric heater being positioned exterior to the tube such that deposits do not form on the electric heater (*see, e.g., Figure 1 and page 4, paragraph **[0018]**, lines 1-5*);
- the heater comprising coils with each heater coil being adjacent to a pair of adjacent tube coils but not encircling an axis of the tube (*see, e.g., Figure 1 and page 4, paragraph **[0018]**, lines 1-5*); and

- the substantial length of the tube along which the electric heater extends defining a volume of less than that required to contain approximately 14 ounces of water such that a user on the aircraft can obtain a supply of heated water having a volume of less than approximately 14 ounces before the water heater begins heating a new supply of heated water (*see, e.g., page 3, paragraph **[0015]**, lines 4-6 and paragraph **[0016]**, line 5).*

Claim 14

Claim 14 is directed to a method of heating small volumes of water for intermittent usage in a wash basin on an aircraft. The method comprises:

- providing a tube (*see, e.g., element 10 in Figure 1, and page 2, paragraph **[0012]**, lines 1-2*) that can be connected to a water outlet;
- the tube being made of a good heat conductive material (*see, e.g., page 2, paragraph **[0013]**, lines 1-3*);
- providing an electric heater (*see, e.g., element 12 in Figure 1 and page 2, paragraph **[0012]**, lines 2-3*) that is in good heat conductive relation with the tube (*see, e.g., page 2, paragraph **[0012]**, lines 2-3 and 4-7*); and
- the tube and the electric heater being in contact over a length that defines a volume of less than that required to contain approximately 14 ounces of water such that a user on the aircraft can obtain a supply of heated water having a volume of less than approximately 14 ounces before the water heater begins heating a new supply of heated water (*see, e.g., page 3, paragraph **[0015]**, lines 4-6 and paragraph **[0016]**, line 5).*

Claim 19

Claim 19 is directed to an aircraft sink water heater. The aircraft sink water heater comprises:

- a water tube (*see, e.g., element 10 in Figure 1, and page 2, paragraph **[0012]**, lines 1-2*) comprising an inlet and an outlet;

- the water tube comprising a spiral configuration to define a series of water tube coils (*see, e.g., Figure 1 and page 3, paragraph **[0013]**, lines 6-8, and page 4, paragraph **[0018]**, lines 1-4*);
- an electric heater (*see, e.g., element 12 in Figure 1 and page 2, paragraph **[0012]**, lines 2-3*) comprising a spiral configuration to define a series of electric heater coils (*see, e.g., Figure 1 and page 4, paragraph **[0018]**, lines 1-5)*; and
- the electric heater coils and the water tube coils having a common axis of curvature (*see, e.g., Figure 1)* and each of the series of electric heater coils being in intimate relationship with only two adjacent coils of the water tube coils(*see, e.g., Figure 1 and page 4, paragraph **[0018]**, lines 1-5).*

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

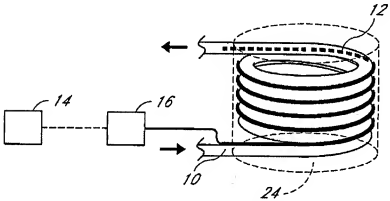
The sole grounds of rejection before the Board is whether the subject matter of each of Claims 1, 2, 4 and 6-25 is rendered unpatentable by the combination of EP 350453 issued to Christophers (hereinafter "Christophers" and attached as Exhibit B), U.S. Patent No. 3,711,681 issued to Leuschner et al. (hereinafter "Leuschner" and attached as Exhibit C) and U.S. Patent No. 4,446,158 issued to English et al. (hereinafter "English" and attached as Exhibit D).

VII. ARGUMENT

For the reasons explained below, Appellant respectfully submits that the rejections of Claims 1, 2, 4 and 6-25 under 35 U.S.C. § 103 are improper and, therefore, Appellant respectfully requests reversal of the rejections. Appellant respectfully submits that a prima facie case of obviousness has not been established.

Brief Explanation of the Aspects of the Present Invention

In general, the present inventions relate to aircraft sink water heaters used in aircraft lavatories. The heaters quickly heat a small volume of water in tube coils, which volume is sufficient to wash a user's hands. *See Abstract.* The used volume of heated water is replenished between uses by heating such that the water heater can be thought to have a small replenishing tank that is defined within the tube coils. The aircraft sink water heater was designed to provide a compact water heating system for intermittent, small volume usage. *[0004].*



As shown to the left in reproduced Figure 1 of the present application, the aircraft sink water heater comprised a water tube 10 that was coiled in a relatively tight spiral, which created a series of coils. *[0011].* The coiled tube 10 was formed with a plurality of coils such that each of the plurality of coils was engaging or close to an adjacent coil. *[0017].* The tube 10 had an inlet and the tube 10 had an outlet that can be in communication with an aircraft wash basin. *[0013].*

An electrical heater 12 was formed in a spiral coil *[0017]* and adjoined the tube 10 in good heat conductive fashion. *[0011].* The heater 12 was positioned external of the tube 10 to limit deposits that would form on the heater 12 if the heater 12 was in direct contact with the water inside of the tube 10. *[0003].* Preferably, the coils of the heater 12 were adjacent to a pair of coils of the tube 10 such that the coils of the heater 12 were positioned within the recesses defined between adjacent coils of the tube 10. *[0017].* The heater 12 extended along a substantial length of the tube (e.g., a substantial length is sufficient to contain a volume of less

than that require to contain approximately 14 ounces of water) and was in good heat conductive relation with the tube 10. *[0011].*

Discussion of the Applied References

The obviousness rejection is based upon a combination of three references: Christophers; Leuschner; and English. Each of these references will be introduced before the basis for the rejections will be discussed.

Christophers

Christophers, which is in the German language, was relied upon solely based on the English Abstract. The title of Christophers translates to "Washbasin with Radiator." The English Abstract states:

> The radiator contains a plurality of heating pipes (5), which are situated one above another and are each bent in an approximately U-shaped fashion and are arranged below a wash stand panel (1) around a wash-basin (2). The horizontally extending heating pipes (5) are each connected at their ends to an approximately vertical supply and return line (6, 7) to form a stable unit. The said unit is fastened by means of fastening lugs or the like to the vertical wall of a building. In this way, the heating device can be installed independently of the wash stand/wash-basin.

Thus, Christophers taught a washstand 1 that contained a wash-basin 2 and that included a radiator surrounding the washbasin 2. The radiator comprised U-shaped heating pipes 5 that were connected to a flow pipe 6 and a return pipe 7 of a central heating or domestic water pipe (see EP 0 350 453 B1 – English Claim 1)

The radiator of Christophers received heated water from a heated water supply external of the radiator disclosed by Christophers. Christophers, in Claim 6, recited that an electric heating member could be inserted into one heating pipe 5. Thus, water would presumably flow around the electric heating member as it flowed through the heating pipe 5 to buffer the heat generated while also heating the water. Such a construction would result in deposits being formed on the electric heating member..

Leuschner

Leuschner taught an electric flow-through heater for making coffee. The assembly of Leuschner consisted of a water tube 3 that had an exterior surface fixed to a tubular heating body 4 along its length. To ensure consistent heat transfer relative to the prior art constructions, the

water tube 3 and the tubular heating body 4 were tightly clamped by lugs and were joined to each other by brazing 5. The heated tube of water was used to heat the carrier plate, upon which a pot of coffee or the like could be supported.

English

English taught an apparatus for making individual beverage servings. In particular, English taught regulating the flow of water through a coffee containing filter unit whereby the coffee flavor could be efficiently extracted by the flow of water through the coffee grinds while the water flow did not take an undesirable length of time. The amount of hot water created was dependent upon the amount of water initially provided. Thus, if a single cup of hot water was provided, then the flow-through coffee maker would heat all of the water that was provided (i.e., one cup) while brewing with the disclosed apparatus.

The Rejection

At the outset, Appellant submits that at least one of the applied references clearly is from nonanalogous art and Appellant also submits that the applied references are not properly combinable. In addition, even if the references were properly combinable, the combination fails to teach every limitation of the rejected claims. For at least these reasons, Appellant requests that the rejections be reversed.

Nonanalogous Reference

Nonanalogous references are not properly used in forming an obviousness rejection. In order to rely on a reference, the reference must either be in the field of endeavor of the claimed invention or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned. *See In re Oetiker, 977 F.2d 1443, 1446 (Fed. Cir. 1992).*

In this case, the Examiner has applied English as a secondary reference. English teaches a single serving coffee filtration unit. The unit presumably is manually supplied with water. The unit does not have any water supply tubes or any other components related to the rejected claims. While the reference has been relied upon for a teaching of flow regulation, the coffee filter itself is regulating the flow of water. When considered as a whole, this reference has absolutely nothing to do with a small scale water heater to be used in an aircraft lavatory or a method of heating water with such a heater. Thus, given the vast differences in subject matter, English properly is considered nonanalogous art.

In addition, English is not reasonably pertinent to the problems being solved by the claimed inventions. The claimed inventions were directed to reducing the volume of heated water and to reducing the overall size of the water heater. The claimed inventions heated a small volume of a water intermittently such that, upon use of the heated volume, a new heated volume was created during the typical period of time between successive uses. Creating a single serving coffee filtration unit is not reasonably pertinent to these problems or any other problems being solved by the claimed inventions.

Thus, Appellant respectfully submits that English is not analogous art and is not properly usable in formulating the present rejections.

The Combination is an Improper Use of Hindsight

Assuming solely for the sake of argument that English is considered suitable for formulating the present rejections, the rejections are based upon an improper combination of references. With proper references, a *prima facie* case of obviousness can only be shown when, among other criteria, there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. *See M.P.E.P. § 2143.*

As explained in M.P.E.P. § 2141.01, the references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in the applicant's disclosure. *See In re Vaeck, 947 F.2d 488 (Fed. Cir. 1991).* Thus, the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention. *See Hodosh v. Block Drug Co., 786 F.2d 1136, 1143 (Fed. Cir. 1986).* The present rejections are based upon a combination of references that require rather substantial leaps in logic to combine.

As explained above, the rejected claims recite a water heating apparatus for use with aircraft wash basins and a method of heating water for aircraft wash basins. The primary reference, Christophers, taught a space heating radiator that supported a water basin. Leuschner, one of the secondary references, taught a flow through heater for a coffee maker hot plate. English, the other of the secondary references, taught a single use coffee filter configuration. Briefly stated, absent hindsight, Appellant respectfully submits that one of ordinary skill in the

art wishing to design a small scale water heating device for use on airplanes would not start with a space heating radiator and modify it with the teachings of a hot plate and a coffee filter to arrive at the claimed inventions. Nothing in the references or the prior art in general suggest the desirability of making the combination as set forth in the rejections.

In Christophers, the radiator was connected by an inlet and an outlet to a hot water supply, such as a building's hot water system, and included multiple tubes that extended in parallel with each other, as opposed to extending in series, between the inlet and the outlet. In addition, the water in the radiator was not supplied to the water basin. The water basin simply was supported by the radiator.

Leuschner has been combined with Christophers. Leuschner taught a flow through water heater for a coffee maker hot plate. The supposed teaching or suggestion for the combination was to use the flow through heater to lead to more effective heating of the fluid. Christophers, however, used an existing heated water supply to heat a room through multiple parallel flow paths and, it appears, also had an internal electric heater in at least one of the flow paths. The electric heater, however, was positioned inside of the flow path to allow water to carry the heat supply throughout the radiator rather that supplying heat in a single region. If the heat supply of Leuschner were used, the heat supply would be external of the water tubes and an occupant of the heated room would be more likely to be burned upon contact with the heat supply. Moreover, with an external heat source, the heat must first pass through the tube wall before coming into contact with the water. Thus, the water, which is being used to heat the room in Christophers, is not more efficiently heated by an external heater. Christophers, with its internal electric heater, was more efficient and there is no reasonable teaching or suggestion in the prior art that would lead one to combine these two references.

Further, English taught a single cup coffee filter that regulated the flow rate of coffee through the filter to result in coffee having a consistent strength from one cup to the next. The reference taught treating just enough water, such as through a "Mr. Coffee," to create one cup of coffee at a time, presumably when one cup of water was provided. The supposed suggestion for combining English with the references above was to limit the heating volume. Again, the primary reference was a radiator for space heating. One of ordinary skill in the art would not likely be led to modify a space heating radiator to have a small volume of water used to heat the

space, especially given the need for a large amount of heat transfer required to heat a small room. There is no reasonable teaching or suggestion in the prior art that would lead to combining English with the other two applied references to obtain the recited water heaters.

In short, the claims in the present application each recite a water heater for use with an aircraft wash basin or a method of heating small volumes of water or intermittent usage in an aircraft wash basin. The claims have been rejected based upon a combination of: (1) a space heating radiator that is connected into a hot water system of a building; (2) a hot plate heating element that uses a tubular heating body to heat water for heating the hot plate; and (3) a single cup coffee filter. The only reasonable basis for combining these references is Appellant's own disclosure, which is an improper use of hindsight.

The Applied Combination Renders Christophers Changes the Principle of Operation

Moveover, the applied combination impermissibly changes the principle of operation of Christophers. As explained above, the primary reference, Christophers, taught a room heating radiator, which is commonly used to supply heat to a small room. Thus, heated water, supplied from a building heated water supply or heated by an internal electric heater, would be passed through the tubular members to heat the room. There was no teaching of supplying the heated water to the wash basin.

To make this modification would require significant changes to the operating principles of the closed circuit water flow path taught by Christophers. For instance, heating a constantly moving water flow involves different controls that heating an intermittently moving volume of water. Transitioning Christophers to a water heater for water to be supplied to the wash basin would require temperature controls, such as a thermostat or the like, which were not used in the simple structure taught by Christophers.

Moreover, as explained above, English taught passing only a single cup of water through a coffee maker such that a single cup of coffee could be made. Appellant submits that passing only a single cup of water through Christophers' room heating radiator would render the radiator inoperable as well due to the small amount of heat carried by the system and available for heat transfer into the room. For at least these reasons, modifying Christophers such that it is a water heater for intermittent use and not a radiator that supports a wash basin would impermissibly change the principle of operation of Christophers.

The References Fail to Teach or Suggest Every Limitation

Assuming solely for the sake of argument that the references are properly combinable, a *prima facie* case of obviousness still has not been established. As is well known, the prior art references, when combined, must teach or suggest all the claim limitations. *See M.P.E.P. § 2143.* In this case, many different limitations are not taught by any applied reference. Therefore, the combination also could not teach those limitations.

Claim 1

Claim 1 recites, among other limitations, a tube comprising a plurality of coils with each coil engaging or being close to an adjacent coil. None of the three applied references taught or suggested coils.

Christophers taught four U-shaped members connected to a common inlet and a common outlet. Thus, the flow did not circular from one U-shaped member to the next in a serpentine manner. In other words, the heated water did not flow through the U-shaped members in series. Rather, the heated water flowed through the U-shaped members in parallel. Christophers did not teach coils, let alone a plurality of coils with each coil engaging or being close to an adjacent coil.

Leuschner also did not teach a plurality of coils with each coil engaging or being close to an adjacent coil. Rather, Leuschner only taught a single tube that was bent back upon itself to form a single loop. Thus, Leuschner failed to teach or suggest a tube comprising a plurality of coils with each coil engaging or being close to an adjacent coil.

English also failed to teach or suggest a tube comprising a plurality of coils. English did not teach a tube and therefore could not have taught a coiled tube.

Thus, none of the applied references taught a tube comprising a plurality of coils with each coil engaging or being close to an adjacent coil. Because none of the applied references taught a tube comprising a plurality of coils with each coil engaging or being close to an adjacent coil, the combination of the three applied references also did not teach such a construction.

Similarly, all three references failed to teach or suggest a heater comprising coils. Only Leuschner taught an external heater and the heater of Leuschner was bent back upon itself to form a single loop. The only heater taught by Christophers was disposed inside the tube.

English did not teach a heater. Thus, none of the applied references taught a heater comprising coils and, therefore, the combination could not have taught such a construction.

Because none of the applied references taught a coiled tube or a coiled heater, none of the references taught or suggested each heater coil being adjacent to a pair of adjacent tube coils but not encircling an axis of the tube. Thus, the combination of the references did not teach or suggest such a construction.

Finally, none of the applied references taught that the substantial length of the tube along which the heater extended was a length that defined a volume of less than that required to contain approximately 14 ounces of water. Irrespective of whether the limitations relating to an aircraft are limiting or not, and irrespective of whether the limitations relating to the specific volume are limiting, none of the applied references taught limiting the length of the tube along which the heater extended based upon the volume contained therein.

For all of these reasons, Appellant submits that Claim 1 is patentable over the applied combination.

Claim 4

Claim 4 depends from Claim 1 and further recites that the tube has a circular exterior cross-section such that the sections create a recess between the sections and that the heater is positioned in the recess.

Regardless of whether the applied references taught a tube having a circular exterior cross-section, none of the applied references taught the plurality of coils needed to create the recess nor that the heater was positioned in the recess. Leuschner, the only reference that taught an external electric heater, taught an electric heater that was positioned in vertically overlapping relationship with the tube. Thus, none of the references taught the recited construction.

For all of these reasons, in addition to the reasons discussed above with respect to Claim 1, Appellant submits that Claim 4 is patentable over the applied combination.

Claims 6 and 7

Claims 6 and 7 depend from Claim 1 and further recite, respectively, that the heater coils are on the outside of the tube coils and that the heater coils are on the inside of the tube coils. These constructions are shown in Figures 1 and 5 respectively.

None of the applied references taught the plurality of coils of either the tube or the heater. For at least this reason, none of the applied references taught the relative positioning between the heater coils and the tube coils. Thus, none of the references taught the recited construction.

For these reasons, in addition to the reasons discussed above with respect to Claim 1, Appellant submits that Claims 6 and 7 are patentable over the applied combination.

Claim 8

Claim 8 depends from Claim 1 and further recites that the tube and the heater define a tubular bundle of coils.

None of the applied references taught any tube coils or any heater coils. Accordingly, none of the applied references taught a bundle of coils defined by a tube and a heater. For at least this reason, none of the references taught the recited construction.

For this reason, in addition to the reasons discussed above with respect to Claim 1, Appellant submits that Claim 8 is patentable over the applied combination.

Claim 9

Claim 9 depends from Claim 1 and further recites that the tube and the heater is each formed with a plurality of coils that are sufficiently large to extend around the exterior of a lower portion of a wash basin.

Again, none of the applied references taught a tube or a heater that was formed with a plurality of coils. Thus, regardless of whether any reference taught positioning a tube around an exterior of a wash basin, none of the applied references taught the recited construction.

For this reason, in addition to the reasons discussed above with respect to Claim 1, Appellant submits that Claim 9 is patentable over the applied combination.

Claim 14

Claim 14 recites a tube that is connected to a water outlet. Christophers taught a tube that was connected to a supply pipe and a return pipe. The water flowing through the radiator of Christophers did not exit the water system than any water outlet connected to the tube. Thus, Christophers did not teach such a construction.

Leuschner also did not teach a tube that was connected to a water outlet. Leuschner et al. taught a connection among a water tube 3, a tubular heating body 4 and a carrier plate 1. Thus, Leuschner did not teach the recited construction.

English did not teach any tubes or any water outlets. Thus, English did not teach the recited construction.

Because none of the applied references taught a tube that was connected to a water outlet, the combination of the references also failed to teach such a construction.

Further, none of the applied references taught a tube and an electric heater that were in contact over a length that defined a volume of less than that required to contain approximately 14 ounces of water such that a user on an aircraft can obtain a supply of heated water having a volume of less than approximately 14 ounces before the water heater begins heating a new supply of heated water. As explained above, Christophers did not teach an electric heater at all, Leuschner did not teach the limited contact length and English did not teach any tubes, heaters or contact between the two. Because none of the applied references taught the recited construction, the recited combination did not teach such a construction.

For all of these reasons, Appellant submits that Claim 14 is patentable over the applied combination.

Claim 15

Claim 15 depends from Claim 14 and further recites providing the tube and the heater with coils with the heater coils being in good heat conductive relation with adjacent tube coils.

None of the applied references taught a tube and a heater with coils such that the heater coils can be in good heat conductive relation with adjacent tube coils. Leuschner, the only reference that taught an electric heater, taught an electric heater that was a single loop. Thus, none of the references taught the recited construction.

For all of these reasons, in addition to the reasons discussed above with respect to Claim 14, Appellant submits that Claim 15 is patentable over the applied combination.

Claim 16

Claim 16 depends from Claim 15 and further recites applying electrical energy to the heater to heat less than 14 ounces of water in the tube to at least about 115° F in no more than about three minutes.

None of the applied references taught heating less than 14 ounces of water in the tube to at least about 115° F in no more than about three minutes. Leuschner, the only reference that

taught an electric heater, taught an electric heater that was a single loop and did not teach the temperature, the volume or the time recited by Claim 16. Thus, none of the references taught the recited method.

For all of these reasons, in addition to the reasons discussed above with respect to Claim 14 and Claim 15, Appellant submits that Claim 16 is patentable over the applied combination.

Claim 17

Claim 17 depends from Claim 14 and further recites that the coil has an inlet and an outlet with the outlet being in fluid communication with the aircraft wash basin.

None of the applied references taught a tube having an outlet that was in fluid communication with an aircraft wash basin. Christophers taught a radiator in which the radiator was supplied with heated water from a building water heating system and that water was returned to the water heating system. To supply the water to the wash basin would require a steady flow of heated water from the radiator into the wash basin, such that the temperature of the water in the radiator would be not maintained to a level sufficient for use in heating the room. Leuschner did not teach having an outlet that was in fluid communication with an aircraft wash basin and English did not teach a tube, let alone an outlet. Thus, none of the references taught the recited construction.

For all of these reasons, in addition to the reasons discussed above with respect to Claim 14, Appellant submits that Claim 17 is patentable over the applied combination.

Claim 18

Claim 18 depends from Claim 17 and further recites that the water outlet empties into the aircraft wash basin.

None of the applied references taught a water outlet that emptied heated water into an aircraft wash basin. As explained directly above, Christophers taught a radiator in which the radiator was supplied with heated water from a building water heating system and that water was returned to the water heating system. To supply the water to the wash basin would require a steady flow of heated water from the radiator into the wash basin, such that the temperature of the water in the radiator would not be maintained to a level sufficient for use in heating the room. Leuschner did not teach having an outlet that was in fluid communication with an aircraft wash

basin and English did not teach a tube, let alone an outlet. Thus, none of the references taught the recited construction.

For all of these reasons, in addition to the reasons discussed above with respect to Claim 14 and Claim 17, Appellant submits that Claim 18 is patentable over the applied combination.

Claim 19

Claim 19 recites a water tube comprising a spiral configuration to define a series of water tube coils. None of the applied references taught such a construction. Christophers taught a plurality of U-shaped tubes arranged in parallel. Leuschner et al. taught a water tube with a single loop. English did not teach any water tube. Thus, none of the applied references taught such a construction and, therefore, the combination could not have taught such a construction.

Claim 19 also recites an electric heater that comprises a spiral configuration to define a series of electric heater coils. Again, none of the applied references taught such a construction. Neither Christophers nor English taught any electric heater. The electric heater taught by Leuschner was not in a spiral configuration such that it defined a series of electric heater coils.

Given that the applied references failed to teach these two constructions, the applied references also failed to teach that the heater coils and the water tube coils have a common axis of curvature and that each of the series of electric heater coils is in intimate relationship with only two adjacent coils of the water tube coils. Thus, the applied combination failed to teach this construction as well.

For all of these reasons, Appellant submits that Claim 19 is patentable over the applied combination.

Claims 20 and 21

Claims 20 and 21 depend from Claim 19 and further recite, respectively, that the heater coils are positioned solely to the outside of the water tube coils and the heater coils are positioned solely to the inside of the water tube coils. These constructions are shown in Figures 1 and 5 respectively.

None of the applied references taught the plurality of coils of either the tube or the heater. For at least this reason, none of the applied references taught the relative positioning between the heater coils and the tube coils. Thus, none of the references taught the recited construction.

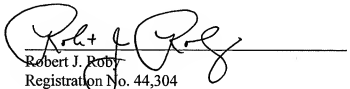
For these reasons, in addition to the reasons discussed above with respect to Claim 19, Appellant submits that Claims 20 and 21 are patentable over the applied combination.

VIII. CONCLUSION

For the reasons set forth above, Appellants respectfully submit that the rejections of Claims 1, 2, 4 and 6-25 are improper, and request that these rejections be reversed.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP



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CLAIMS APPENDIX

1. (Previously Presented) A water heating apparatus for use with a wash basin on an aircraft, the apparatus comprising:

a tube made of good heat conductive material, said tube comprising a plurality of coils with each coil engaging or being close to an adjacent coil;

an electric heater extending along a substantial length of said tube in good heat conductive relation with the tube, said heater being positioned exterior to said tube such that deposits do not form on said heater, said heater comprising coils with each heater coil being adjacent a pair of adjacent tube coils but not encircling an axis of said tube; and

said substantial length of said tube defining a volume of less than that required to contain approximately 14 ounces of water such that a user on the aircraft can obtain a supply of heated water having a volume of less than approximately 14 ounces before the water heater begins heating a new supply of heated water.

2. (Original) The apparatus of Claim 1, wherein the heater is brazed to the tube or joined to the tube with a heat conductive epoxy.

3. (Cancelled)

4. (Previously Presented) The apparatus of Claim 1, wherein said tube has a circular exterior cross-section such that said sections create a recess between said sections, and said heater is positioned in said recess.

5. (Cancelled)

6. (Previously Presented) The apparatus of Claim 1, wherein the heater coils are on the outside of the tube coils.

7. (Previously Presented) The apparatus of Claim 1, wherein the heater coils are on the inside of the tube coils.

8. (Previously Presented) The apparatus of Claim 1, wherein the tube and the heater define a tubular bundle of coils.

9. (Original) The apparatus of Claim 1, wherein said tube and said heater are each formed with a plurality of coils which are sufficiently large to extend around the exterior of a lower portion of a wash basin.

10. (Previously Presented) The apparatus of Claim 9, including the wash basin, wherein the wash basin is sized and configured for placement in the aircraft.

11. (Previously Presented) The apparatus of Claim 1, wherein said heater configured to supply sufficient heat about 60° F to about 115 ° F in about three minutes.

12. (Original) The apparatus of Claim 11, wherein said tube has an outer diameter of about ¾ of an inch and a length of about 74 inches.

13. (Original) The apparatus of Claim 12, wherein said tube is made of copper or stainless steel.

14. (Previously Presented) A method of heating small volumes of water for intermittent usage in a wash basin on an aircraft, said method comprising:

providing a tube to be connected to a water outlet, said tube being made of good heat conductive material;

providing an electric heater in good heat conductive relation with the tube, said tube and said electric heater being in contact over a length that defines a volume of less than that required to contain approximately 14 ounces of water such that a user on the aircraft can obtain a supply of heated water having a volume of less than approximately 14 ounces before the water heater begins heating a new supply of heated water.

15. (Original) The method of Claim 14 comprising:

providing said tube and said heater with coils, with said heater coils being in good heat conductive relation with adjacent tube coils.

16. (Previously Presented) The method of Claim 15 comprising:

applying electrical energy to the heater to heat less than about 14 ounces of water in said tube to at least about 115° F in no more than about three minutes.

17. (Previously Presented) The apparatus of Claim 1, wherein said coil has an inlet and an outlet and said outlet is in fluid communication with said aircraft wash basin.

18. (Previously Presented) The method of Claim 14, wherein said water outlet empties into said aircraft wash basin.

19. (Previously Presented) An aircraft sink water heater comprising a water tube, the water tube comprising an inlet and an outlet, the water tube comprising a spiral configuration to define a series of water tube coils, an electric heater comprising a spiral configuration to define a

series of electric heater coils, the electric heater coils and the water tube coils having a common axis of curvature and each of the series of electric heater coils being in intimate relationship with only two adjacent coils of the water tube coils.

20. (Previously Presented) The aircraft sink water heater of Claim 19, wherein the electric heater coils are positioned solely to the outside of the water tube coils.

21. (Previously Presented) The aircraft sink water heater of Claim 19, wherein the electric heater coils are positioned solely to the inside of the water tube coils.

22. (Previously Presented) The aircraft sink water heater of Claim 19, wherein the electric heater extends along substantially the entire length of the series of water tube coils.

23. (Previously Presented) The aircraft sink water heater of Claim 19, wherein the water tube is formed of a potable water compatible material.

24. (Previously Presented) The aircraft sink water heater of Claim 19, wherein the electric heater is insulated with a lightweight insulating material.

25. (Previously Presented) The aircraft sink water heater of Claim 19 further comprising a temperature responsive switch positioned within the water tube coils, the temperature responsive switch being in electrical communication with the electric heater.

IX. EVIDENCE APPENDIX

A. Copy of the Present Application as Filed
B. Copy of Christophers
C. Copy of Leuschner
D. Copy of English

X. RELATED PROCEEDINGS APPENDIX

None